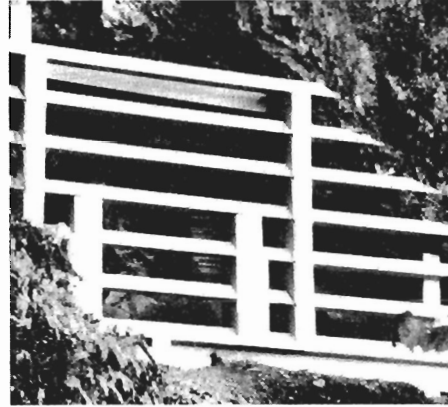


State Nature Preserve Spotlight:



Indiana bats (*Myotis sodalis*) in tightly packed cluster (on left) and Line Fork Cave gate (on right)

Kingdom Come State Park Nature Preserve

by Kristin Snyder

One of eight state nature preserves located within a Kentucky State Park, Kingdom Come State Park Nature Preserve is located in some of the most rugged terrain in the state. In southeastern Kentucky, Pine Mountain's spine-like crest and abrupt northern face make it one of the most spectacular topographic features in the region.

Located in Harlan and Letcher Counties, Kingdom Come State Park can be reached from U.S. 119 in Cumberland, Ky. or from the Little Shepherd Trail which runs for 38 miles along the crest of Pine Mountain. The 1,361-acre park, established in 1962, is named for John Fox Jr.'s popular 1903 novel, "The Little Shepherd of Kingdom Come." On entering the park, visitors drive by Log Rock, a natural sandstone arch. For those hoping to stretch their legs, there are five miles of hiking trails. There are also several overlooks along the crest of Pine Mountain which provide spectacular views of the mountainous countryside.

Viewer who direct their attention downward from Creech Overlook, 12 O'Clock Rock, or Halcomb Overlook see the 225-acre state nature preserve, which includes the entire portion of the park that lies on the rocky north face of Pine Mountain. This tract was dedicated in the spring of 1992, becoming Kentucky's 25th state nature preserve.

Kingdom Come State Nature Preserve protects two small mammals that are considered rare in our state--the masked shrew (*Sorex cinereus*) and the Kentucky red-backed vole (*Clethrionomys gapperi maurus*). But the primary reason for dedication is the presence of Line Fork Cave, the state's third

largest hibernaculum for the federally endangered Indiana bat (*Myotis sodalis*).

From September to April, Indiana bats hibernate in tightly packed clusters with about 300 bats per square foot (see photo on left). In mid-May the female bats leave the cave before the males and arrive at summer maternity roosts in colonies of 15 to 100 individuals. Each mother raises a single offspring, born during June, under loose bark of a dead or living tree. It is believed that floodplain forest is important habitat for Indiana bat summer populations; however, maternity populations have also been located in upland areas. Between early August and mid-September, the bats arrive near the cave and engage in swarming and mating activity. During this time, fat reserves are built up for hibernation. Indiana bats feed primarily on moths and other small, night-flying insects.

Line Fork Cave harbors more than 3,000 Indiana bats, but historically, 10,000 of the endangered mammals inhabited the cave. What happened to the rest? Several factors have probably contributed to their decline. Habitat loss may be the single most important factor; millions of acres of floodplain forest have been cleared for human use, and the bats have been forced to compete for remaining habitat or attempt to live in marginal areas. At Line Fork Cave, the largest factor contributing to their decline probably is disturbance by humans. Since caves are very fragile systems, any visitation by humans disrupts the biological and geological processes occurring in the cave. In the past, some visitors have intentionally killed hibernating bats, but even

(Continued on Page 8)



Silphium laciniatum

All in a Day's Work

by Landon McKinney



Rudbeckia subtomentosa

The sound of thundering explosives jar the ground; helicopter gunships hover low, keeping a watchful eye on the terrain, and camouflaged troops maneuver through the undergrowth. Scenes from the John Wayne classic "The Green Beret" or perhaps "Platoon" with Charlie Sheen? What do they have to do with the work of the Kentucky State Nature Preserves Commission? These are just a few of the training activities one becomes aware of while conducting a rare plant search on the Ft. Campbell Military Reservation.

Through the efforts of the Tennessee field office of The Nature Conservancy, KSNPC was contracted to conduct a search for rare plants on the Kentucky portion of this military reservation. This effort has allowed me to work closely with two good friends, Wayne Chester (Austin Peay State University, Clarksville, TN) and Eugene Wofford (University of Tennessee, Knoxville, TN) who are conducting the search for rare plants

on the Tennessee portion of the reservation.

Ft. Campbell is the home of the 101st Airborne as well as several other combat and support units, and it is a major training facility. Prior to initiating our search, we were all briefed on protocol and given maps indicating areas off limits.

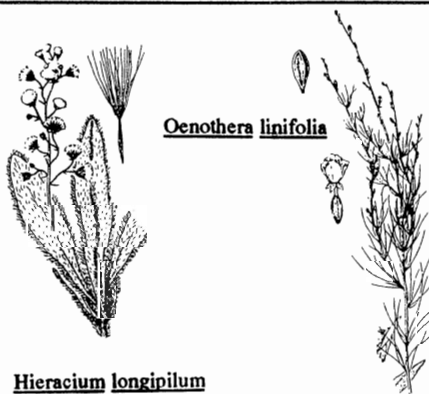
The first year of a two year project has been completed, and my search has turned up several interesting finds. Two rare plants were previously known from the Kentucky portion of the reservation--compass plant (*Silphium laciniatum*) and sweet coneflower (*Rudbeckia subtomentosa*)-- and four additional rare plants have been found this year. These include long-haired hawkweed (*Hieracium longipilum*), thread-leaf sundrops (*Oenothera linifolia*), a rare grass (*Muhlenbergia glabriflora*), and a rare sedge (*Carex alata*) [see corresponding line drawings]. I am looking forward to finding other rare plants this year.

While various training activities have been quite abusive to the land-

scape, much of the reservation has been maintained in an open habitat. During presettlement times much of the area now occupied by the reservation was part of the "Big Barrens" region of Kentucky. While most of this native grassland community has been converted to farmland over the last century, many of the plants common to this community type have found refuge in small remnant populations, several of which occur on the reservation.

Besides the rare plants, several of these barren remnants have proven to be quite noteworthy from the standpoint of biodiversity. This has added a greater significance to what has already become quite an interesting project.

As a Vietnam veteran, the sights and sounds of the training activities occurring in the distance make this project a little unnerving at times and certainly different from normal fieldwork. However, the results have made it worthwhile and professionally satisfying.



Hieracium longipilum

Oenothera linifolia

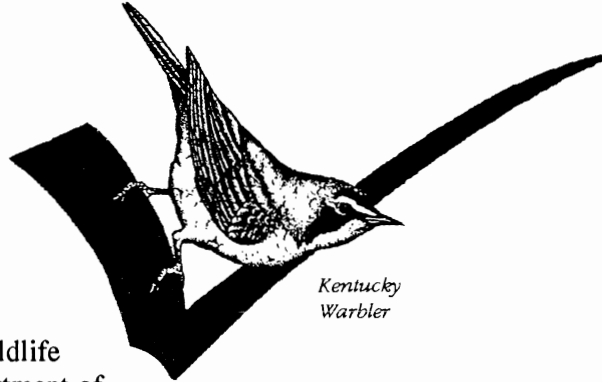


Muhlenbergia glabriflora

Carex alata

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Kentucky
Warbler

**Nature and Wildlife Fund
Kentucky Income Tax
Checkoff Program**

This year the Nongame Wildlife Program in the Kentucky Department of Fish and Wildlife Resources (KDFWR) and the Kentucky State Nature Preserves Commission (KSNPC) have changed, and hopefully improved, our promotional campaign for "checkoff" donations on the Kentucky personal income tax return. The fund was renamed *Nature and Wildlife Fund*, replacing the old *Nongame Wildlife/Natural Areas Fund*; a new logo featuring a Kentucky warbler perched on a checkmark was developed; a 17" x 22" full-color poster featuring a photo of Bad Branch State Nature Preserve will be distributed to tax preparers, H & R Block offices, and places where people pick up Kentucky income tax booklets; and much additional literature has been developed for educating Kentuckians about their opportunity to participate in protecting Kentucky's natural heritage.

In tax year 1992, over \$95,000 was donated by about 18,000 taxpayers. This was a record high amount, but still relatively low in comparison to similar programs in other states. We expect that by providing better information, including details of past expenditures, more Kentuckians will be willing to financially support these programs. KDFWR has used donations for bald eagle surveys; osprey, river otter, and peregrine falcon re-introductions; general nongame inventories; and public education on the importance of nongame wildlife. KSNPC has used the donations mostly for natural areas acquisition, including portions of the acquisition costs of Metropolis Lake, Bad Branch, Brigadoon, and Pilot Knob State Nature Preserves. Checkoff funds provide seasonal staff and management monies for the state nature preserves system.

We encourage our supporters to look for brochures at tax preparer offices, and if you use a professional preparer, please encourage him or her to ask all clients if they wish to donate. This "checkoff" system is the least expensive fundraising mechanism for large numbers of Kentuckians to donate relatively small amounts to our program efforts. May you all qualify for state tax refunds!

New Discoveries of Federally Endangered and Threatened Species

by Margaret Shea

Searching for very rare plants can be frustrating when hours or days of work result in no new discoveries. When a new population is discovered, however, the reward is well worth the frustration! During the 1993 field season, botanist Margaret Shea and seasonal botanist Amy Bruenderman were rewarded with three new populations of two federally threatened or endangered species. Inventories for two federally listed species and two candidates for federal listing in 1993 were partially funded by the United States Fish and Wildlife Service.

A new population of the federally threatened Price's Potato-bean (*Apios priceana*) was discovered in far western Kentucky (Livingston County). Price's Potato-bean is a vine in the pea family that produces showy clusters of purple flowers. This new discovery is the sixth known population of the species in Kentucky. The new population is especially significant because it is the only population in Kentucky that is not adjacent to a road or trail. We hope that its remote location will make it easier to protect. The scenic

(Continued on Page 6)



VOLUNTEER NEWS

by Cindy Campbell

Unlike the autumn leaves, whose brilliant colors finally faded, KSNPC volunteers didn't lose their spirit nor their willingness to help out on the state nature preserves this fall.

October 23 was a reunion of sorts with both familiar and new faces joining together at Jim Scudder State Nature Preserve in Hardin County. By the end of the day, half the length of a new trail was completed. Although this preserve is not yet open to the public, a trail is needed to provide an easier and safer walk into the interior of the preserve for stewardship workers carrying heavy loads. A good deal of digging into the steep slopes was required to level the trail tread and we are appreciative of the workmanship shown by Cynthia Riedel, James and Josephine Puckett, Dick Shore, Darren Payne, Chris Smigell, Sharon McCauley, Angie and Kristi Reyes, Tom Puckett and Matt Simpson. (Congratulations to Tom and Angie on their recent marriage!) In addition to trail work, several pines and cedars that had fallen near the prairie were removed. The trees no longer pose a fire hazard for controlled burns at the prairie and will not be shading the sun-loving grasses next year.

On November 12, the Evans family consisting of Mary Anne, Mary Rose, Roy, Brent, Emily, Andrew and Ellen gathered under threatening skies to install several waterbars on a section of eroded trail at Beargrass Creek State Nature Preserve in Jefferson County. This work is the first phase of a trail rehabilitation project being conducted by Mary Anne who is working on her Girl

(Continued on Page 7)

Stream Adventures:

In Search Of Blackside Dace

by Ellis L. Laudermilk

During our childhood many of us have undoubtedly gone down to a nearby stream to hunt for "crawdads" or toss a few rocks into the creek. We've heard stories about that great big, old fish that Grandpa almost caught or that huge turtle that calls the stream home. But what other organisms live in Kentucky's streams? Certainly we know about bluegills, creek chubs and bass, but whoever heard of a fish called a blackside dace?

The blackside dace (*Phoxinus cumberlandensis*) is a brilliantly colored member of the minnow family Cyprinidae. Even many ichthyologists were unaware of its existence until it was officially recognized as a new species in 1978, and was subsequently listed by the United States Fish and Wildlife Service as a threatened species on June 12, 1987. It is restricted in distribution to tributaries of the upper Cumberland River drainage (mainly that portion upstream from Cumberland Falls) in a small section of northeastern Tennessee and the southeastern Kentucky counties of Bell, Harlan, Knox, Laurel, Letcher, McCreary, Pulaski, and Whitley.

Blackside dace are small, beautiful minnows which may reach 2.75 inches in length, and only live for approximately three years. They are usually olive to green-gold along the back (dorsum), and silver-white to red

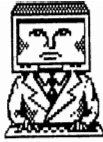
along the underside (venter). Two dusky stripes along the side converge on the caudal peduncle (slender part of the body just in front of the tail fin), and coalesce into a wide black stripe on large males. Many black specks are sprinkled along the back and upper sides. As is common with many other species of fishes, males exhibit spectacular coloration during the breeding season. They are bright red along the underside, behind the opercle (bony cover of gill chamber just behind the cheek), and at the dorsal fin base. Pectoral (uppermost of the two paired fins) and pelvic (lowermost of two paired fins) fins are yellow with bright silver bases. The wide, black stripe serves to highlight these vivid colors, which rival many of the tropical fish species so revered by fish hobbyists. Among Kentucky's fishes, it most closely resembles the southern redbelly dace (*Phoxinus erythrogaster*) which, as its common name suggests, is also striking in coloration.

Blackside dace typically inhabit small (7-15 feet wide), cool (seldom exceeding 70°F) upland streams with moderate flows, limited siltation, and at least 70 percent canopy cover. Undercut stream banks, especially those with roots, rocks, or other cover, in pools or slow moving water are the favorite habitat. Feeding has

(Continued on Page 6)



Blackside Dace (*Phoxinus cumberlandensis*)



Oh! The Budget...

by Bob McCance



My first experience with drafting (and redrafting) a Kentucky state agency biennial budget request was one I shall not soon forget. My first attempt was 88 pages; the re-write was 64 pages. Most state agencies are large enough to employ a budget officer or accountant who has primary responsibility for this job. For KSNPC, it was Melissa White (officially "secretary", but also payroll officer, accountant, and many other jobs) and myself. Our operating budget request was divided into four proposals.

"Current Services"

This proposal contains the existing program with the following changes: (a) a 10% permanent staff cost reduction; no equipment (including replacement equipment needs); a limit of 2% increase on operations (all travel, rent supplies, commodities, utilities, etc.); a 5% increase for permanent staff on their starting date anniversary; and 3% increase for seasonal workers.

"Expand Preserve Protection and Program Management"

This is our highest priority additional request. This request would add eight additional permanent staff. Three new preserve managers would help care for the 31 state nature preserves totalling over 10,000 acres. Currently, one general fund permanent staff and three person-years of seasonal employee time (funded largely by the income tax checkoff donations) are allocated to preserve management -- boundary protection, neighbor relations, facility development, habitat management, and vandalism repair.

Additional positions that would be funded include: (1) an accountant to handle payroll, expenditures and income processing, grant management, and budgeting; (2) a community ecologist to conduct plant community inventory as part of the statewide natural areas inventory; (3) a data specialist to process inventory information and provide data services to the increasing number of businesses, consultants, government agencies, and researchers who need biological data for environmental impact statements, project planning review, and research; (4) two branch managers to lead an inventory unit and an operations unit that will consist of preserve management, data management, landowner contact, and land acquisition. This budget request would also fund support costs for these employees and purchase computer equipment for them.

"Restoration-Personnel Reduction"

This is our second priority additional request. It is for replacement of the permanent staff cost reduction identified in the Current Services Budget. KSNPC cannot maintain existing programs adequately; a reduction would be devastating.

"Maintenance of Existing Services"

This is our third (but nonetheless very important) priority. This request would provide money for current activities that could not be placed in the Current Services Budget request. This includes salaries for three college interns in FY 95 and for five college interns, two preserve management seasonal workers, and one seasonal environmental biologist in FY 96. It also includes money for higher rent, utilities, and communications charges due to our planned March 1994 move; replacement computer and other equipment that could not be included in the Current Services request; higher transportation costs due to Department of Transportation management of all state vehicles; and other regular operating costs that could not be included in the Current Services Budget request.

I had been telling people that acquiring funds for additional nature preserve stewards was my highest priority, but after 160+ hours on budget preparation work, that accountant was looking mighty important to me!

Conclusion

Our two primary missions -- inventorying the state and operating a nature preserves system -- do not come cheap. Yet we believe that the people of Kentucky are very fortunate to have a wealth of beautiful natural diversity -- we wish to save the best 1% for future Kentuckians. It is a good investment, and one with which Natural Resources and Environmental Protection Cabinet Secretary Phillip Shepherd agrees -- he has made our staff expansion request the Cabinet's #1 operating budget priority! The Kentucky Conservation Committee also has made KSNPC's operating and land acquisition budget requests its highest legislative priority for the upcoming session of the Kentucky General Assembly.

The budget's next stop is the Governor's Office of Policy and Management, where the Administration's budget is assembled and many of the state's tough decisions are made.

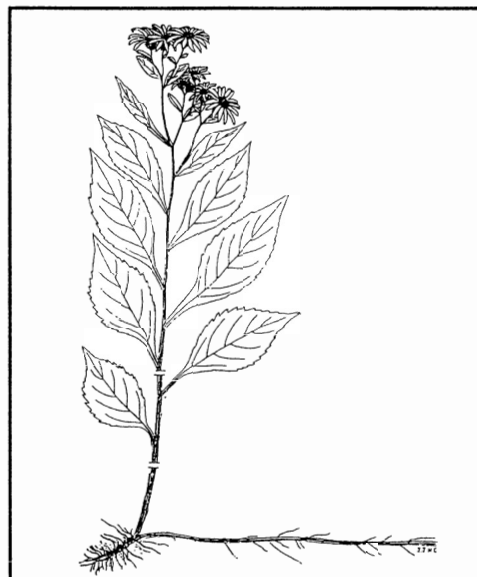
(New Discoveries; Continued from Page 3)

The scenic location is adjacent to a creek and a 30 foot limestone bluff.

Two populations of a federally endangered species, Virginia spiraea (*Spiraea virginiana*), were discovered along the rocky banks of Laurel River. Virginia spiraea is a shrub in the rose family that grows on water-washed gravel bars. When the plants receive sufficient sun, they produce large clusters of tiny white flowers. One of the two new populations was large and healthy and was flowering profusely. A large portion of Laurel River has been dammed to create Laurel River Lake. The new populations were discovered in Laurel County just upstream from Laurel River Lake.

Status surveys were completed for two species that are candidates for federal listing as endangered or threatened, Rockcastle aster (*Aster saxicastellii*) and Water stitchwort (*Stellaria fontinalis*). Status surveys provide the U.S. Fish and Wildlife Service with information necessary to determine whether the species should be listed under the U.S. Endangered Species Act.

Rockcastle aster was discovered along the Rockcastle River in 1987 and described by Julian Campbell and Max Medley. During inventory for the species in 1993, 16 populations of the species were discovered or verified in Kentucky on boulder bars



Rockcastle aster (*Aster saxicastellii*)

along the Rockcastle River and the Big South Fork. A number of the populations are adjacent to trails and are threatened by trampling.

Four new populations of Water stitchwort were discovered along tributaries of the Kentucky River. The species blooms in the early spring and grows in dense mats on wet, limestone cliffs. In Kentucky, the species is known from the Kentucky River and seven of its tributaries.

(Stream Adventures continued from Page 4)

typically consists of schools of 5 to 20 individuals. The minnows forage on submerged rocks in association with other fishes such as stonerollers (*Camptostoma* spp.) primarily by grazing algae and other periphytic material, as well as periodically plucking food organisms from sandy substrates.

Sexual maturity is reached during the fall of the first year of life in females, and both sexes are presumably capable of spawning the following spring. Based on a limited number of observations, spawning takes place from May through July. Silt-free, gravel pit nests located in shallow areas of pools or runs, usually constructed and still occupied by stonerollers, are used during spawning. Aggregates of 10-20 brilliantly colored individuals have been observed hovering over these gravel pits, even completely

concealing the host minnow. Groups of two or three males often leave the pit area in an attempt to coax females back to the spawning nest by vigorously chasing and nipping them. If successful, the males position themselves on either side and above the female, pressing her to the nest in a spawning frenzy.

During 1993, over 200 sites in the upper Cumberland River drainage in Kentucky were sampled by KSNPC staff to provide information about the distribution of this federally threatened species to the Kentucky Department for Surface Mining Reclamation and Enforcement for coal mining permit review requirements. As a result of these surveys, blackside dace were documented from at least 27 streams which were previously unknown to harbor them. Most of these newly discovered populations were from streams in Knox, McCreary and

Whitley counties. However, the remainder were widely scattered throughout the region with many populations limited to short, headwater sections of the stream due to habitat and stream degradation. Consequently, some populations may be reproductively isolated from others, thereby reducing their chances for gene exchange.

What threats to the blackside dace have been identified? Unfortunately, the range of this threatened species coincides with the coal-rich regions in Kentucky and Tennessee. Activities related to coal mining such as acid mine drainage, siltation/sedimentation, stream alteration, etc., probably have contributed to its decline and continue to threaten remaining populations. However, other land uses which also

(Continued on Page 8)

Volunteer News continued from page 4

Scout Gold Award. We look forward to more workdays with Mary Anne in the future.

We inherited substantial amounts of cast-off debris in the process of expanding Raymond Athey Barrens State Nature Preserve in Logan County so we called on our local volunteers to help do a little preserve cleaning. The situation looked precarious the day before the scheduled November 20 workday. While watching the rain steadily fall, we decided to cancel the delivery of the dumpster which Southern Sanitation Inc. of Russellville had so generously offered. The large delivery truck would have done considerable damage to the ground which was getting softer by the minute. However, we did not give up on the workday and were pleased to wake up to a crisp day full of sunshine. Marge Deller, Ned and Sandy Kearny, Chris Smigell, Cynthia Riedel, Ed Craft, Brainard Palmer-Ball and Richard Cassell diligently scavenged and pulled from ravines, sinkholes and the woods a variety of junk which was stockpiled in central locations. Many boxes of building materials were removed from the old house on the site and sorted for recyclables. Thanks to all those who joined us that day, it will be much easier to remove these consolidated piles from the preserve when we reschedule the dumpster delivery.

A very special thanks to preserve monitors, Ed Craft and Tony Newman, who assisted with the controlled burns conducted at Raymond Athey Barrens and Logan County Glade State Nature Preserves in Logan County. Recently Ed has spent many field hours with stewardship staff assisting with a wide range of management duties. We always welcome his insightful comments and greatly



New Staff

Malissa Lenn of Danville is a recent graduate of Centre College. She started in November in a seasonal position as a data specialist working on forestry-related data. Malissa expects to start graduate school in the autumn of 1994; we will teach her about biological data management and operations of a state nature preserve program. She will be an enormous help to our data processing team.

appreciate the hospitality that he and his wife, Tina, extend to us whenever we are in their neck of the woods.

We would like to express our gratitude to Pine Mountain Survey members, Jeff Josefosky, Tammy Heazlit, David and Karen Schang, Rick Kowalczyk, Bob Devers, Mike Crockett, Robert Taylor, Jim and Helen Wright, David Hibbard, Kevin Betz, Donna Lehman and David Vander Ark. During 1993, this team of Michigan and Kentucky cavers donated 994 hours and have now mapped a total of 2.5 miles of Line Fork Cave in Kingdom Come State Park Nature Preserve in Letcher County (see Preserve Spotlight article on Page 1).

We want to extend our perpetual thanks to our preserve monitors, Lucia Beeler, Tony Newman, Ed Craft, Paula Quinn, Joey Roberts, Chuck Donaldson, Larry Kelley, Ned and Sandy Kearny, and Jerry McDonald. We look forward to the speedy return of Donovan Smith to the team. Our best wishes to Stacy Williamson, who is finishing up his senior year at Georgetown College and to Michael Whitt at his new home.

We have been extremely fortunate to have Kathy Carter volunteer in the office since the end of October. Kathy has spent most of her time upon retiring from state government doing volunteer service for the Morehead Ranger District. She will be returning to her duties there in the spring. Meanwhile, her sincerity, patience and willingness to learn have proven to be quite an asset for the Commission. Thank you, Kathy!

Summer Staff

With the addition of several seasonal employees during 1993, the Commission staff temporarily expanded to near record size. We wish to acknowledge and express our appreciation to the following employees who helped the Commission accomplish many important tasks.

Aaron Jamison, Mark Gumbert and Matt Mays spent the summer assisting Brainard Palmer-Ball, terrestrial zoologist, with conducting terrestrial vertebrate survey work, primarily mist netting for bats. This work was performed to fulfill contract requirements with Fort Knox and the Kentucky National Guard. All three have returned to Eastern Kentucky University to pursue their degrees.

Steve McMurray and Brent Winters were hired to assist aquatic biologists Ronald Cicerello and Ellis Laudermilk with stream surveys and related office work. Brent returned to his undergraduate studies in

biology and geography at Eastern Kentucky University in August and Steve returns to Eastern in January to complete his degree in Environmental Resources.

Amy Bruenderman has spent the last 8 months working with botanists Margaret Shea and Deborah White. Primarily she has been involved with rare plant species field inventories. Amy will conclude her second season with the Commission in January when she will begin graduate school at Eastern Kentucky University.

Julia Huff and Steve Morris spent 5 months working with stewardship staff, Joyce Bender, Cindy Campbell and Kris Snyder implementing a variety of management tasks on selected state nature preserves across the state. Exotic species control, trail maintenance and firebreak construction filled the majority of their time with us. Julia and Steve moved on to new adventures at the end of November.

The Kentucky State Nature Preserves Commission is mandated to identify and preserve remnants of Kentucky's natural heritage in a statewide system of nature preserves.

(Stream Adventures continued from Page 6)

degrade water quality such as logging, road construction, agriculture, development, etc., have contributed to the decline of aquatic species.

Blackside dace have withstood thousands of years of change, but our ability to rapidly and drastically alter its habitat has placed it, as well as many other species, at an extreme disadvantage in the evolutionary process. We can only hope that as we learn more about this fascinating little minnow, increased awareness and protection of its habitat will help ensure its continued existence, as well as guarantee that future generations have an opportunity to go down to the creek and hunt crawdads and other interesting aquatic organisms.

(Preserve Spotlight continued from page 1)

accidental disturbances can be fatal to the fragile animals. During the bats' hibernation, each human entry into Line Fork Cave causes them to awaken and waste valuable stored fat reserves. If a bat is unable to conserve its limited fat supplies until spring, it will starve to death or emerge too weak to hunt its insect prey.

In a cooperative effort to protect the Indiana bats, the Commission, the Kentucky Department of Parks, the Kentucky Department of Fish and Wildlife Resources, and the U.S. Fish and Wildlife Service installed a specially designed cave gate (see photo on page 1) at the entrance in July 1991. The gate is kept locked from September 1 until April 30 to protect the hibernating bats, but the cave may be visited between May and August by obtaining a key from the park supervisor.

The task of surveying this complex cave has been undertaken by experienced cavers of the Pine Mountain Survey, consisting mostly of members of the Michigan Interlakes Grotto. In only two years, the adventurous group has mapped over two miles of the cave's passages. The surveyor's maps will allow biologists to locate roosting areas in the cave that were previously unknown. The Commission is very grateful for all of their hard work and dedication to the preservation of Line Fork Cave and the Indiana bats.

NOTE: The Commission and the Department of Parks recommend that only experienced cavers with proper training and equipment enter the cave. The rugged path to the cave is very steep and the climb down is considered strenuous.

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